

Oxford Physics Group Projects 2019 - 2020: Adaptix GP_001

Project title	Mobile 3D X-ray imaging
Project type	Experimental
Company	Adaptix
Mentor	Dr Steve Wells
Local supervisor	Prof Stephen Tucker
Project description	<p>The Company Adaptix are revolutionising the way 3D images are obtained. Our devices give 3D information which is better than a normal 2D X-ray. Instead of transporting a patient to an expensive CT scanner, our devices are small and light enough to be brought to the patient and quickly give 3D information for a much lower dose of radiation than CT. We are making a leap similar to the transition from tube TVs to flat panels. Instead of a single, heavy, old-fashioned X-ray tube, we use a flat panel array of miniature X-ray emitters to fire X-rays from different positions so we can derive 3D information using parallax effects.</p> <p>Normally 3D images are only possible from firing X-rays all around a patient in a big, expensive CT scanner using a relatively high radiation dose. We derive a set of slices in 3D by viewing the patient from many angles from a stationary, flat panel, in the same way that having 2 eyes gives you depth perception. This improves the ability to see early stage cancers or subtle fractures.</p>

We are also looking at applying a similar approach to non-destructive testing of electronics and composite materials.

The Project

The mix of these activities (physics, maths, engineering, software) could be varied to some extent to suit the candidate(s)

- Experimenting with ways to induce fractures in materials (e.g. bone, carbon fibre composites) and imaging these faults with 2D imaging, our device and a CT scanner.
- Running experiments in our X-ray bunker to capture images of test objects.
- Using image analysis tools to assess the visibility of fractures.
- Exploring how machine learning software could be used to support more automated detection of fractures (if the student has software skills).
- Modelling how future products could look and operate using CAD (if the student has CAD skills).